Quark-Antiquark and Diquark Condensates in Vacuum in a 3D Two-Flavor Gross-Neveu Model

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Abstract: The effective potential analysis indicates that, in a 3D two-flavor Gross-Neveu model in vacuum, depending on whether G_S/H_P is less or bigger than the critical value 2/3, where G_S and H_P are respectively the coupling constants of scalar quark-antiquark channel and pseudoscalar diquark channel, the system will have the ground state with pure diquark condensates or with pure quark-antiquark condensates, but never with coexistence of the two forms of condensates. The similarities and differences in the interplay between the quark-antiquark and the diquark condensates in vacuum in the 2D, 3D and 4D two-flavor four-fermion interaction models are summarized.

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